processes[3]. In these investigations the counter coincidence method has been used. In all cases the results obtained, in conformity with the present results, confirm the light-quantum theory and the strict applicability of the conservation principles.

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[1] *Phys. Rev.*, **49**, 8 (1936).
[2] NATURE, **137**, 614 (1936).
[3] Bothe and Maier-Leibnitz, *Göttingen Nacht.*, **10**, 127 (1936). 4. C. Jacobsen, NATURE, **138**, 25 (1936). Present results were reported at Physics Conference, Zurich, July 1.

Influence of Temperature on the 'Groups' of Slow Neutrons

WE have investigated the influence of temperature on the activation of silver by slow neutrons, separating the effects due to the groups *A*, *B* and *C* as defined by Amaldi and Fermi[1]. The arrangement used is shown in plan in Fig. 1. Absorbers of cadmium

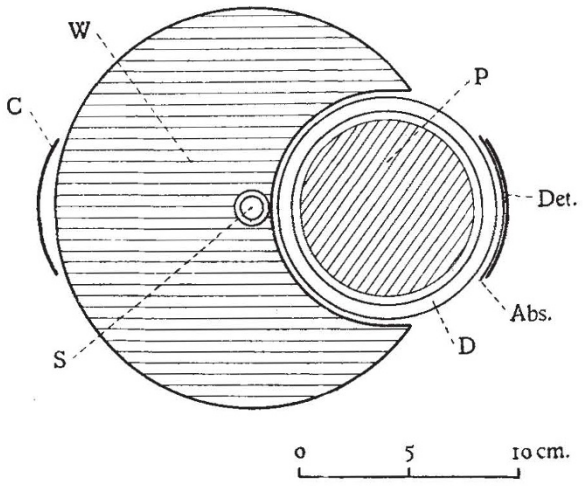

FIG. 1. *S*, neutron source (beryllium and radon); *W*, tin containing water; *D*, Dewar vessel; *P*, paraffin wax; *Det.*, silver detector; *Abs.*, cadmium and/or silver absorbers; *C*, position of detector for comparison runs.

(0·258 gm./cm.²) and silver (0·077 gm./cm.²) were employed to separate the groups, and the use of a thicker absorber of silver (1·023 gm./cm.²) enabled changes in the absorption coefficients of groups *B* and *C* in silver to be measured. For the low temperatures the paraffin wax was cooled with liquid nitrogen or hydrogen. The results obtained were as follows:

	Group	290° K.	77° K.	20° K.
Activity induced	*C*	100·0 ± 1·4	83·7 ± 1·3	96·4 ± 1·2
	B	100·0 ± 2·0	101·4 ± 2·0	88·5 ± 1·6
	A	100·0 ± 5·0	75·3 ± 5·6	72·0 ± 5·4
Absorption coefficient	*C*	100·0 ± 4·5	117·8 ± 5·2	160·8 ± 5·0
	B	100·0 ± 7·0	123·1 ± 7·0	110·6 ± 6·7
'Number of neutrons' (= activation / abs. coeff.)	*C*	100·0 ± 4·7	71·1 ± 3·2	60·0 ± 2·2
	B	100·0 ± 7·3	82·4 ± 5·0	80·1 ± 5·1

N.B. Each row has been scaled to make the first figure 100, and figures in different rows are not comparable. The errors shown are the mean square errors due to statistical fluctuations.

Some measurements using ice instead of paraffin wax in the Dewar vessel have given similar results.

It will be seen that groups *A* and *B*, as well as *C*, are affected by changes of temperature. This is in contradiction with the estimates of the energies of the former groups hitherto accepted[2], which gave values of several electron-volts, compared with the 0·037 e.v. or less corresponding to the temperatures used. For other reasons it appears unlikely that the energies of groups *A* and *B* have values lying in the region of thermal equilibrium, but according to our experiments they cannot be greatly in excess of such values. It follows from this that the assumption that the absorption coefficient of boron varies inversely as the velocity of the neutrons must be in error.

We desire to thank Lord Rutherford for putting the facilities of the laboratory at our disposal, and Dr. M. L. Oliphant for helpful discussions. It is hoped to continue experiments on these lines, and a fuller account will be published in due course.

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[1] *Ric. Scient.*, (ii), **6**, 344 and 443 (1935); (i), **7**, 454 (1936).
[2] Amaldi and Fermi, loc. cit.; Frisch and Placzek, NATURE, **137**, 357 (1936); Weeks, Livingstone and Bethe, *Phys. Rev.*, **49**, 471 (1936).

Mechanism of Carbohydrate Breakdown in Early Embryonic Development

DURING the past twelve months, we have been engaged in a systematic study of the intermediary mechanisms of carbohydrate breakdown in the chick embryo in the first week of its developmental period. Although we have not yet brought our work to a conclusion, we wish to give an interim summary of it.

Attention has been concentrated throughout on the embryo of 4–6 days' incubation, and the first experiments done were measurements of anærobic glycolysis with different substrates. It is found that glucose and mannose are the only sugars which give a steady long-continuing glycolysis; disaccharides, even when phosphorylated (such as trehalose-phosphate), and pentoses, are unattacked; as also is fructose. Chemical estimations show that lactic acid is formed quantitatively during glycolysis. Various parts of the embryo separately give the same result as the whole embryo, so that the relatively large proportion of nervous tissue present cannot be held accountable. Addition of inorganic phosphate does not increase the glycolytic rate of glucose or mannose, or cause the breakdown of other sugars. Glycogen is not glycolysed by pulped or minced embryo any more than it is by intact embryos, and even fairly active acetone powders prepared according to the method applied to brain by v. Euler, Gunther and Vestlin[1], will not glycolyse glycogen. With intact embryos, embryo-*Brei* and acetone powders, there is often an induction period of a few minutes in the glycolysis of mannose and glucose; this initial lag may be abolished by the addition of co-zymase or adenyl-pyrophosphate.

The trisaccharide of Levene and Mori[2] (2 mannose plus 1 glucosamine), contained in egg proteins, is not attacked by intact embryos; but when the mannose has been made available by hydrolysis, embryos can glycolyse the product. Probably the yolk-sac